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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/696,204  | 10/29/2003  | Ying Zhou            | ITL.1024US (P16711) | 7312             |
| 21906   | 7590        | 06/02/2005           | EXAMINER            |                  |
| TROP PRUNER & HU, PC<br>8554 KATY FREEWAY<br>SUITE 100<br>HOUSTON, TX 77024 |             |                      | ESTRADA, MICHELLE   |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 2823                |                  |

DATE MAILED: 06/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/696,204

Applicant(s)

ZHOU ET AL.

Examiner

Michelle Estrada

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6,8-21,23-32,34 and 35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4,8,11-13,15,18-21,26,28,31,32,34 and 35 is/are rejected.
- 7) ☒ Claim(s) 5,6,9,10,14,16,17,23-25,27,29 and 30 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

The finality of the Office Action mailed 3/23/05 is withdrawn.

#### ***Claim Objections***

Claim 20 is objected to because of the following informalities: in line 3, it appears that --being-- should be inserted after "dielectric". Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 8, 11-13, 15, 18-21, 26, 28, 32, 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yao (6,679,996) in view of Tijburg et al. (5,969,419).

With respect to claim 1, Yao discloses soaking a substrate (1) having a dielectric (2) deposited thereon in a salt solution (Col. 7, lines 12-25), said dielectric having a first dielectric constant; and depositing an oxide (3) on said dielectric, said oxide having a second dielectric constant different from the first dielectric constant.

Yao does not specifically disclose adjusting the pH of the salt solution.

Tijburg et al. disclose having a substrate with a dielectric formed thereon; immersing the substrate in a salt solution and adjusting pH (Col. 3, lines 55-60).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Yao and Tijburg et al. to enable the pH-adjusting step of Tijburg et al. to be performed in the process of Yao to obtain optimum complexing of the metal ion (Col. 3, lines 55-60).

With respect to claim 2, Yao discloses wherein depositing an oxide on said dielectric includes depositing aluminum oxide on said dielectric (Col. 9, lines 17-32), the Examiner clarifies that Yao discloses using a fluoride ion capturing agent added to the aqueous solution to deposit the layer of a corresponding metal oxide or a solid solution thereof, one of these ion capturing agent can be aluminum chloride, therefore aluminum oxide will be formed on the dielectric layer since aluminum oxide is the corresponding metal oxide of aluminum chloride (Col. 9, lines 17-33).

With respect to claim 3, Yao discloses wherein soaking said substrate in said salt solution includes soaking said substrate in a salt solution comprising an aluminum salt (Col. 9, lines 29-32 and 58-61).

With respect to claim 4, Yao discloses wherein soaking said substrate in said salt solution comprising said aluminum salt includes soaking said substrate in a aqueous solution comprising the capturing agent, therefore the salt solution comprises aluminum chloride dissolved in water (Col. 7, lines 15-25).

With respect to claim 8, Tijburg et al. disclose having a silicon oxide formed in the substrate and then immersing the substrate in the salt solution.

With respect to claim 11, Yao discloses exposing a dielectric (2) deposited on a substrate to a salt solution; and causing an oxide which is different from said dielectric on said substrate to form on said dielectric, at least a portion of said dielectric to remain between said substrate and said oxide as part of a functional structure (Col. 7, lines 12-20).

With respect to claim 12, Yao discloses including exposing said dielectric on said substrate to an aluminum salt solution (Col. 9, lines 29-31).

With respect to claim 13, Yao discloses including exposing said dielectric on said substrate to an aluminum chloride solution (Col. 9, lines 29-31).

With respect to claim 15, Tijburg et al. disclose adjusting the pH of said salt solution.

With respect to claims 18 and 21, Tijburg et al. disclose wherein exposing said dielectric layer to said salt solution includes exposing a dielectric layer of silicon dioxide.

With respect to claim 19, Yao discloses removing said substrate from said salt solution and rinsing (Col. 11, lines 1-8).

With respect to claim 20, one of ordinary skill in the art would have been led to the recited exposure time through routine experimentation to achieve a desired rate of reaction. In addition, the selection of exposure time, its obvious because it is a matter of determining optimum process conditions by routine experimentation with a limited number of species of result effective variables. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re

Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996)(claimed ranges or a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill or art) and *In re Aller*, 105 USPQ 233 (CCPA 1995) (selection of optimum ranges within prior art general conditions is obvious).

Note that the specification contains no disclosure of either the critical nature of the claimed exposure time or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen exposure time or upon another variable recited in a claim, the Applicant must show that the chosen exposure time are critical. *In re Woodruf*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

With respect to claim 21, Yao discloses depositing a dielectric (2) on a substrate (1) using a first method of deposition; and depositing an oxide (3) on said dielectric by immersing said substrate in a salt solution (Col. 7, lines 12-30), said deposition by immersing different from said first method of deposition.

With respect to claim 26, Yao discloses wherein depositing an oxide on said dielectric includes depositing aluminum oxide on said dielectric by immersing said substrate in an aluminum salt solution (Col. 9, lines 17-32), the Examiner clarifies that Yao discloses using a fluoride ion capturing agent added to the aqueous solution to deposit the layer of a corresponding metal oxide or a solid solution thereof, one of these ion capturing agent can be aluminum chloride, therefore aluminum oxide will be formed

on the dielectric layer since aluminum oxide is the corresponding metal oxide of aluminum chloride (Col. 9, lines 17-33).

With respect to claim 28, Tijburg et al. disclose adjusting the pH of said salt solution.

With respect to claim 32, Yao discloses exposing a semiconductor substrate (1) to a salt solution to form at least a portion of a film (3) on the surface of the substrate, the film or portion thereof including aluminum oxide as the primary film material (Col. 9, lines 53-60).

Yao does not specifically disclose adjusting the pH of the salt solution.

Tijburg et al. disclose having a substrate with a dielectric formed thereon; immersing the substrate in a salt solution and adjusting pH (Col. 3, lines 55-60).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Yao and Tijburg et al. to enable the pH-adjusting step of Tijburg et al. to be performed in the process of Yao to obtain optimum complexing of the metal ion (Col. 3, lines 55-60).

With respect to claim 34, Yao discloses including exposing said semiconductor substrate to an aluminum salt solution (Col. 9, lines 29-32 and 58-61).

With respect to claim 35, Yao discloses including depositing a dielectric (2) that is not aluminum oxide on the substrate (1) before exposing the substrate to the salt solution (Col. 3, lines 20-35).

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Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yao (6,679,996) in view of Tijburg et al. as applied to claims 1-4, 8, 11-13, 15, 18-21, 26, 28, 32, 34 and 35 above, and further in view of Ishikawa et al. (2004/0200962).

The combination of Yao and Tijburg et al. does not disclose wherein depositing a dielectric on a substrate includes using a chemical vapor deposition technique to deposit said dielectric. Yao's dielectric layer is a polymer, preferably a resist.

Ishikawa et al. teach that resists can be deposited by CVD method (See Paragraph [0065]).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Yao, Tijburg et al. and Ishikawa et al. to enable the dielectric formation step of the combination to be performed according to the teachings of Ishikawa et al. because one of ordinary skill in the art would have been motivated to look to alternative suitable methods of performing the disclosed dielectric formation step of the combination and art recognized suitability for an intended purpose has been recognized to be motivation to combine. See MPEP 2144.07.

#### ***Allowable Subject Matter***

Claims 5, 6, 9, 10, 14, 16, 17, 23-25, 27, 29 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.




**Conclusion**


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Estrada whose telephone number is 571-272-1858. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2800.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
MEstrada  
May 23, 2005

  
George Fourson  
Primary Examiner  
Art Unit 2823